

Chapter 1 starts Here

Ch.1 Matter + Measurement

Chemistry - ~~Study~~ Study of matter and how it changes.

Matter - Anything that takes up ~~a~~ space and has mass (amount) (Volume)

What can you measure?

Length

SI unit

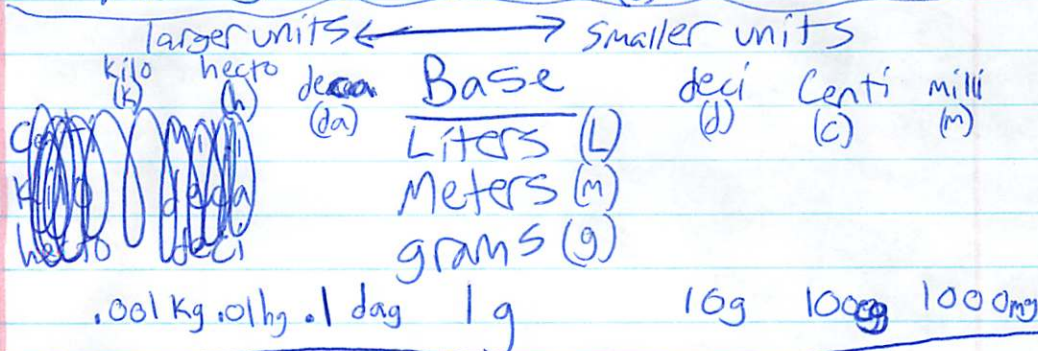
Meters (m)

Volume

Liters (L)

Mass

Grams (g)



Setting up a conversion

$$15 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}}$$

1. Multiply number by a fraction
2. Put units in fraction

↳ convert to → top
convert from — bottom

$$15 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}} = 15,000 \text{ m}$$

3. Put numbers into conversions
 ↳ Metric only

1. Put a 1 in front of bigger unit.
2. Put a power of ten base # of columns in front of smaller #

$$5 \text{ mm} = \underline{\hspace{1cm}} \text{ hm}$$

$$5 \text{ mm} \times \frac{1 \text{ hm}}{100,000 \text{ mm}} = 0.00005 \text{ hm}$$

Accuracy - how close a measurement is to the real or accepted value.

Precision - how close a series of measurements are to each other.

$$\text{Accuracy - \% error} = \frac{\text{observed value} - \text{actual value}}{\text{actual value}} \times 100\%$$

calculate

$$\text{Precision} = \text{Avg.} \pm \frac{\text{Range}}{2}$$

5.23

4.85

4.96

5.28

4.91

~~5.04g~~

5.05g $\pm \frac{0.43g}{2}$

5.05g $\pm 0.215g$

Physical Properties - props of matter observed without change.

~~Not constant~~
extensive
Size
Shape
length
mass
Volume
texture

constant
Intensive
Color
Density
melting point
Freezing point
Boiling point

Amount
Dependent

Not amount dependent
Substance specific.

$$\text{Density} = D = \frac{m}{V}$$

$$D = \frac{3.14g}{10.6mL}$$

$$D = 0.296 \frac{g}{mL}$$

$$\text{Density of Water} = 1 \frac{g}{mL}$$

$$D = \frac{m}{V}$$

$$150 \frac{11.4g}{mL} = \frac{150g}{V}$$

~~$$150 \frac{11.4g}{mL}$$~~

$$V = \frac{m}{D}$$

$$V = \frac{150g}{11.4 \frac{g}{mL}}$$

$$V = 13.2mL$$

Finding Volume
water displacement
 $V_{\text{object}} = V_f - V_i$

Dimension
 $V_{\text{Box}} = L \times W \times H$
 $V_{\text{cylinder}} = \pi r^2 h$

